

REMARKS

CLAIMS STATUS

Claims 1-8 are pending in the application. Claims 1-8 stand rejected by the Examiner. The Examiner's rejections are addressed below in substantially the same order as in the office action.

CONCERNING IDS SUBMITTED SEPTEMBER 8, 2004

Applicants note that the Examiner has returned, with the Office Action, an initialed copy of the Supplemental Information Disclosure Statement submitted on December 7, 2004, but that he has not returned an initialed copy of the (first) Information Disclosure Statement that was submitted on September 8, 2004. Applicants respectfully request that the Examiner review his files to ensure that this document was received and that appropriate consideration and initialing be carried out.

REJECTIONS UNDER 35 USC § 103

Claims 1-8 are rejected under 35 U.S.C. §103(a) as being unpatentable over Lane et al., JACS, vol. 124, pp. 11946-11954 (2002), hereinafter "the Lane article." The Examiner urges that this article discloses the instant epoxidation using hydrogen peroxide in the presence of a transition metal, i.e., Mn, in combination with an inorganic base. He goes on to urge that the recitation of use of an additional "organic compound" in the reaction mixture is met by the references use of dimethylformamide ("DMF") as the solvent, and refers to instant claim 4. He then states that the reference's use of DMF also meets its use as "an organic additive" as recited in claim 6. He concludes that the reason the rejection is not under 35 U.S.C. §102 is that time range and means of separation are recited in Applicants' claim 1, which the Examiner alleges are obvious. He also notes that the recitation of conversions of >99% and 95% selectivity, as claimed in claim 1, is not considered to represent valid limitations, going on to say that the reference also obtains or nearly obtains these results for certain olefins as shown in Tables 2 and 3 of the reference. In particular, the Examiner states that the reference's use of an extra organic additive in the reaction mixture to enhance the rate of epoxidation meets the recitation of "organic compound" in Applicants' claim 1.

Applicants respectfully traverse this rejection on the following bases. Applicants have now requested a number of amendments to the claims in order to clarify the invention and believe that the Examiner will better understand the invention with reference thereto.

The Lane article represents an experimental undertaking at Texas A&M University whereby the researchers attempted to screen a large number of additives that could be used to increase the efficiency of epoxidation by hydrogen peroxide. As stated in that article at the last column on p. 11954, "The main objective of the work ... was to show that screening could facilitate the discovery of an experimentally useful epoxidation system." The researchers believed that they had discovered such a system – one including a manganese salt as a catalyst along with a bicarbonate buffer for use with a variety of alkenes including aryl-substituted, cyclic, and trialkyl-substituted alkenes. Monoalkyl-alkenes were not successfully epoxidized thereby. The final, successful additives were identified as 6 mol % of sodium acetate, used in a BuOH system, or 4 mol % salicylic acid, used in a DMF system.

Like the Lane investigations, Applicants claim use of hydrogen peroxide in the presence of a transition metal salt catalyst and also an inorganic base such as a bicarbonate. However, unlike the Lane investigations, Applicants have discovered an entirely new group of organic additives, including urea, alkyl substituted urea, aryl substituted urea and thio-urea. These additives are readily available, inexpensive, and highly efficacious, resulting in high conversions with excellent selectivity. Furthermore, they may be employed in reaction mixtures including either organic solvents, water, or combinations thereof, ensuring a range of eco-friendly processing possibilities for highly desirable results. Finally, these additives may promote effective epoxidation of monoalkyl-alkenes as well as other alkenes. As such, they may offer an improvement over the sodium acetate and salicylic acid additives identified in the Lane article.

Applicants further wish to point out that the very existence of the Lane article underscores the non-obviousness of any particular additive as an epoxidation enhancer. The university researchers whose work is encompassed in the article screened, by their own admission, some 30 different transition metal salts as catalysts and 68 "diverse compounds" as additives. At page 11950 of the Lane article, in the first column, they noted that

"...[t]he additives were selected to include both organic and inorganic compounds with a diversity of potentially relevant characteristics. These

included acidic and basic functionalities, compounds that could coordinate Mn^{2+} very well (like EDTA) and others that cannot, carboxylates that can bridge metal centers, and compounds with activated carbonyl groups that may react with peroxide anions *in situ*."

In other words, a great deal more than "routine experimentation" was employed by these researchers in identifying the sodium acetate and salicylic acid additives. From this it follows that it also involved a great deal more than "routine experimentation" for Applicants to identify their additives, which do not appear to be addressed in the Lane article.

Applicants have attempted to amend their claims, particularly claim 1, to better distinguish between his use of an organic solvent and an organic additive, and to eliminate any potential overlap in identification of the two components. Accordingly, it is believed that this claim, as well as the subsequent dependent claims, are now patentably distinguishable over the Lane article. Withdrawal of this rejection is therefore now respectfully requested.

Claims 1-8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the Lane article in view of Payne et al., U.S. Patent 3,053,856. The Examiner urges that Payne supplies the addition of nitriles as catalysts, which is missing from the Lane article, and concludes therefrom that it would have been obvious for one of ordinary skill in the art to modify the Lane disclosure by adding a known organic compound catalyst such as a nitrile.

The Applicants respectfully traverse this rejection and refer again to the failure of Lane to either directly teach, or to in any way suggest, the specific organic additives now claimed by Applicants in their broadest claim. Furthermore, nitriles of any type have now been removed from the scope, or potential scope, of "organic additive" in Applicants' broadest claim. As such, Applicants believe that this rejection has now been effectively rendered moot or effectively overcome and its withdrawal is respectfully solicited.

Claims 1-8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the Lane article in view of the Majetich article cited by Applicant. The Examiner urges that Majetich discloses that formamide or carbodiimide increases the rate of epoxidation with hydrogen peroxide, thereby providing identification of an organic compound that is missing from the Lane article.

KSP-C1005US

Applicants again respectfully traverse this rejection and note respectfully that the Majetich teaching, as a secondary reference, does nothing to remedy the clear limitations of the Lane article as discussed in detail hereinabove, and furthermore represents organic compounds that are no longer claimed as organic additives by Applicants. While formamide might be used as an organic solvent in Applicants' invention, such is distinguished from the organic additive and any overlap or potential overlap has now been eliminated. Accordingly, Applicants believe that this rejection has now been rendered moot or effectively overcome and respectfully request its withdrawal.

REJECTION UNDER 35 USC § 112

Claims 1-8 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. It is noted that "organic compound" in claim 1 is deemed by the Examiner to be "too broad and indefinite." Claim 4, recites solvents, yet there is no antecedent basis in claim 1, and "inorganic promoter" in claim 5 is alleged to lack antecedent basis in claim 1.

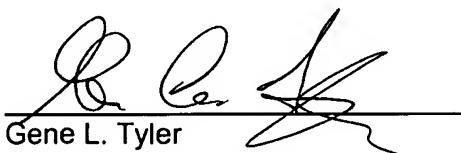
Applicants have attempted to rectify all of the mentioned failings in their amendments requested by this Response. Correction of the antecedent basis problems and distinguishment of terms as discussed in more detail hereinabove should, Applicants believe, serve to render the claims as now constructed fully compliant with the requirements of 35 U.S.C. §112, second paragraph. Accordingly, it is believed that this rejection has now been overcome.

CONCLUSION

For all the foregoing reasons, Applicants submit that this application is now in a condition for allowance, and accordingly, a Notice of Allowance is now respectfully requested. An appropriate Request for Extension of Time and Check for payment of fees is included herewith. If there are additional fees, or if credit for an overpayment is due, the Commissioner is hereby authorized to charge or credit such to **Deposit Account No. 130010 (KSP-C1005US)**.

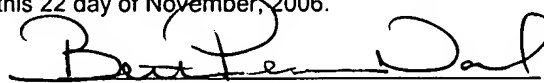
Respectfully submitted,

Dated: November 22, 2006


Gene L. Tyler
Registration No. 35,395
Madan, Mossman & Sriram, P.C.
2603 Augusta, Suite 700
Houston, Texas 77057
Telephone: (713) 266-1130
Facsimile: (713) 266-8510

CERTIFICATE OF MAILING UNDER 37 C.F.R. §1.8(a)

I hereby certify that this paper, along with any referred to as being attached or enclosed, is being mailed to the Attention: MS: Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, via the United States Postal Service, First Class Mail, postage prepaid on this 22 day of November, 2006.


Beth Pearson-Naul